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ABSTRACT

The potential of improved space use as an alternative to new construction in Texas public colleges and universities was evaluated. Space utilization was measured in three ways, each of which viewed room use differently. The average number of hours per week that classrooms and class laboratories are in use on public university campuses was analyzed. Classroom and class laboratories are the two room types most frequently assigned for instruction and most basic to the universities' instructional mission. The percentage of all available rooms on public four-year campuses actually being used for scheduled instruction by hour of the day was assessed, as was the average percentage of seating occupied during scheduled class meetings in classrooms and class laboratories. Classroom and class laboratory student station size (area) in square feet was also considered. The state's five upper-level institutions are discussed, using the same utilization measures and the same data sources. A model for estimating facilities' needs as a practical extension of the basic orientation to space utilization is presented. (SW)

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Space Use - Space Needs

The Availability and Use of Public Senior Higher Education Facilities In Texas

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Space Use - Space Needs

The Availability and Use of Public Senior Higher Education Facilities In Texas

CB Study Paper 28

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FOREWORD

Through its role in the review and approval of facilities construction projects on Texas public college and university campuses, the Coordinating Board increasingly is called upon to collect and analyze data pertaining to the ongoing utilization of higher education facilities. This study presents considerations and conclusions which should have a direct bearing on future solutions to the problems of facilities needs in Texas higher education and which will undoubtedly provoke much discussion. This study is an attempt to measure and evaluate the potential of improved space use as an alternative to new construction. In view of current economic and demographic conditions, this is both necessary and appropriate.

While an examination of the facilities utilization statistics contained in these pages may lead the reader to conclusions critical of the performance of Texas public senior colleges and universities in this area, it should be emphasized at the outset that this performance has been in part determired by circumstances and funding procedures over which the individual institution has little control. Such factors as declining enrollments and facilities construction stimulated by categorical state and federal funding have combined to create relative facilities surpluses and, consequently, inefficient utilization on many campuses. In view of this consideration, the unused margin of facilities potential suggested by this study should be regarded less as a criticism of past performance than as a reservoir of facilities resources which is available to be effectively employed in meeting the needs of the Texas students of the future.

It is the intention and the hope of the Coordinating Board and its staff that the analyses and interpretations contained in these pages will serve as a stimulus to similar and even more thorough studies of space use and facilities needs by the individual institutions, with the shared goal of providing Texas with not only the best but also the most efficiently used and economical higher education facilities possible.

I would like to extend a note of appreciation to Joe Szutz of the Coordinating Board staff for his development of this approach to space need analysis and his efforts in preparing the data and analyses, as well as special thanks to the following individuals who, in the capacity of consultants, gave this study a thorough and critical review:

Mr. Kreon L. Cyros, Massachusetts Institute of Technology
Dr. William S. Fuller, Nebraska Coordinating Commission for Post-Secondary Education
Dr. Gerald S. Leischuck, Auburn University, Auburn, Alabama
Mr. Arthur Lidsky, Dober and Associates, Belmont, Massachusetts
Dr. Jon Regnier, California State University, Long Beach
Dr. Roger Taylor, University of Pittsburgh
Dr. Byron W. Thorsen, Wittenberg University, Springfield, Ohio
Mr. Charles Wheeler, Director, North Carolina State Commission on Higher Education Facilities

In addition, the Facilities Study Committee of the Council of Presidents, Texas Public Universities, reviewed the original draft and shared with the Coordinating Board staff a methodological critique of the study. Two significant refinements recommended by that critique and consistent with the assumptions and the thrust of the study were incorporated in the final draft.

While it is appropriate that the assistance from these sources be recognized here, it is also necessary to point out that although every effort was made to implement the modifications which were recommended, the Coordinating Board staff accepts sole responsibility for the contents of this study.

Kenneth H. Ashworth
Commissioner of Higher Education

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INTRODUCTION

The more efficient use of campus facilities at publicly supported colleges and universities in Texas will be an issue of prime importance in the decade ahead as higher education faces declining or, at best, stabilizing enrollments and more limited funding. Critical need exists for thorough and deliberate management and planning of facilities use. Statewide and national projections indicate that enrollments will level off in the 1980s, and, indeed, signs of this trend already have appeared in Texas. Actual headcount enrollment at Texas public senior colleges and universities increased by 5.46 percent between fall 1975 and fall 1977. The corresponding increase from fall 1977 to fall 1979 was only 2.33 percent, less than one half the rate of the previous two year period, and only one third the rate of increase (7.0 percent) forecast by the Coordinating Board for the latter period. Total statewide growth for the next decade will be only one-tenth of the growth for the last ten years.

Also, the major funding source for capital investment in facilities at 17 state universities was stripped of its revenue-producing potential by the Texas Legislature in 1979. And with spiraling construction and operating costs, the long-range availability of public funds for new facilities must be regarded with caution by the higher education community.

Other economic factors are critical as well. Consider the following:

-- Construction and renovation as well as real estate costs are increasing at a rate of 12 to 13 percent annually.

-- Energy costs continue to rise dramatically. For the 1980-81 biennium, public senior colleges were appropriated $216 million to cover the cost of utilities, a 32 percent increase over the previous

two-year period and an 874 percent increase over a decade ago. In addition, energy availability is not always reliable in the short term and may become increasingly uncertain in the long term.

-- Bonded indebtedness of the public senior colleges, including medical units, was over $1.31 billion as of October 31, 1979.

-- Bonded indebtedness and construction costs represent just the initial capital investment in facilities. Even more significant over the life of a building are debt retirement costs and operating costs, including security, custodial services, maintenance and major repair and rehabilitation. Regardless of whether actual use of a building is very low or very high, funds must be made available for it to be cleaned, maintained, heated and cooled, generally on a full-time basis.

In light of these considerations, this would seem to be an appropriate time to consider again the standards and methods presented in Coordinating Board Study Paper 12: Space Factors and Space Utilization Values for Use in Meeting the Facilities Needs of Texas Colleges and Universities in an evaluation of the actual utilization of public university facilities in Texas. Study Paper 12 provided Texas college and university administrators with space planning guidelines and techniques for the analysis of facilities utilization. Since that study paper was published in July 1971, the expansion of public higher education facilities in Texas has been dramatic. In fact, growth in the availability of facilities not only kept pace with but often exceeded enrollment growth, resulting in a steady increase in space per student at almost every institution. From Fall 1971 until Fall 1977,

the amount of space devoted to Instructional and Library usage at Texas public senior colleges and universities increased by more than 5.2 million square feet or 38.9 percent. The opening of nine new public senior campuses, each with its own facilities, contributed significantly to that increase. During the same period, headcount enrollment rose by only 29.8 percent or just over 73,000 students. Even more importantly, the data analyzed in this study indicate that improvement in the utilization of Texas' existing higher education facilities is a feasible and economic alternative to the fiscally burdensome construction of new facilities. For example, the public senior university campus receives fairly heavy use during the morning and early afternoon hours on all five weekdays, but very little use after 5 p.m. and on Saturday mornings. The actual use of available rooms among individual institutions for single periods and multiple-hour segments of the day as well as the week-long hourly use of rooms indicates that a significant improvement in facilities use efficiency is possible.

STUDY PAPER DESIGN AND METHOD

Three methods of measuring space utilization have been employed in this study. Each looks at room use in a different way, but by combining all three, we get a better composite picture of the availability and use of university facilities.

The first chapter is devoted to an analysis of the average number of hours per week that classrooms and class laboratories are in use on public university campuses*, as suggested in Study Paper 12, based on information

* The terms "public university" and "public four-year" are used interchangeably throughout the study; they refer to institutions which conduct both lower-level and upper-level academic instruction.

submitted by each institution to the Coordinating Board. Classrooms and class laboratories are the two room types most frequently assigned for instruction and most basic to the universities' instructional mission.

The second chapter presents an analysis of the percentage of all available rooms on public four-year campuses actually being used for scheduled instruction by hour of the day, again based on information reported by each institution.

Chapter 3 looks at public four-year student station use, that is, the average percentage of seating occupied during scheduled class meetings in classrooms and class laboratories. Classroom and class laboratory student station size (area) in square feet also is taken into account.

Chapter 4 contains a separate discussion of the state's five upper-level institutions, using the same utilization measures and the same data sources employed in the first three chapters.

The first four chapters each present a discussion of the data* and the analytical method employed and interpretations and conclusions from the analysis.

Chapter 5 presents a model for estimating facilities needs as a practical extension of the basic orientation to space utilization established in the first four chapters. This model employs the data of Chapters 2 and 3 on "hourly rooms use," and "station occupancy," as well as other data essential to an objective assessment of space needs. Chapter 6 provides a brief summary of the findings and implications of the study.

* All data, unless otherwise labelled, are for Fall Semester 1978.

CHAPTER 1

WEEKLY ROOM HOURS

PUBLIC FOUR-YEAR INSTITUTIONS

SUMMARY OF FINDINGS

Weekly Room Hours (WRH) represents the number of hours per week that the average classroom and the average class laboratory are in use for scheduled instructional meetings.

Standards representing the reasonable optimal level of WRH of 38 WRH for classrooms and 25 WRH for class laboratories are presented and explained.

The classroom and class laboratory utilization data reported by the public four-year institutions show that the average classroom is used 15.4 fewer hours per week than the respective standard, and that the average class laboratory could be used 8.5 more hours per week.

The lowest utilization of classrooms reported by an institution is only 12.2 hours per room per week, less than one third of the classroom standard. The lowest reported use of class laboratories is 11.1 hours per room per week, less than one half of the class laboratory standard.

The highest reported utilization of classrooms and class laboratories by individual institutions is 31.9 WRH per classroom by one institution, and 23 WRH per class laboratory by another. These highest reported levels of use are closer to, but still below the standards.

CHAPTER 1

WEEKLY ROOM HOURS

PUBLIC FOUR-YEAR INSTITUTIONS

Weekly room hours (WRH) measure utilization of the time available for the use of rooms. While a campus may be "open for business" 40, 50 or 70 hours per week, all of its assignable instructional rooms will obviously not be used continuously throughout the operating day. Therefore, a measure of the average hours of use provides a meaningful barometer of the efficiency of facilities use. To evaluate this measure of efficiency, a standard must be established by which to judge the weekly use of each room type. For classrooms a standard of 38 hours per room per week is employed; the class laboratory standard is 25 WRH. The standards are explained in the last section of this chapter. The week here consists of five days, Monday through Friday, fourteen hours per day, 8 a.m. through 10 p.m.

The source for the data in this chapter is the Building and Room report which identifies the types of rooms in use, their specific locations and the duration of class meetings in minutes. Hours of room use were calculated to the nearest tenth of an hour for each category of room type in relation to the respective total numbers of rooms scheduled during the semester for each institution and for the aggregate. An analysis of the data follows: Appendix A contains institutional data.

TABLE 1

AVERAGE HOURS OF ROOM USE PER WEEK (WRH)

	AVERAGE WRH	INDIVIDUAL INSTITUTIONAL RANGE
Classrooms	22.6 WRH	12.2 WRH - 31.9 WRH
Class/Labs	16.5 WRH	11.1 WRH - 23.0 WRH

The 23 public universities studied use their classrooms an average of 22.6 hours per week or 15.4 hours less per room than the classroom standard. Weekly room hour usage ranges from 12.2 hours per classroom per week (32 percent of the standard) to 31.9 hours (84 percent of the standard). All 23 campuses are below the 38 WRH classroom standard, 21 use their classrooms an average of less than 30 hours per week, and eleven use them less than 20 hours per week.

Class laboratories are used an average of 16.5 hours per week or 8.5 hours less per room than the class laboratory standard. Again, all 23 institutions are below the 25 hour class laboratory standard, 20 use their class laboratories fewer than 20 hours per week, and twelve average usage of less than 15 hours per room per week.

UTILIZATION STANDARDS

Coordinating Board Study Paper 12 recommended a WRH classroom standard of 30 hours and a class laboratory standard of 20 hours. These standards were based on an operating day of nine hours, 8 a.m. through 4:59 p.m., and a five day week, Monday through Friday.* These standards suggest that each classroom and class laboratory which is available for use 45 hours per week can reasonably be expected to be in use 30 hours and 20 hours respectively out of the 45 hour week. The primary role of a utilization standard or "norm" is to provide a deliberately determined indicator of the reasonable expectation of room use potential.

There is no question that recorded room utilization is a function of

* North Carolina's 1977 Facilities Inventory and Utilization Study also uses a classroom "norm" of 30 WRH based on a 45 hour week (i.e., 8 a.m.-4:59 p.m., Monday through Friday).

total hours taught and/or classes conducted and total rooms available, and not of the length of the operating week. However, in estimating a reasonable use-capacity of a given number of rooms, it is necessary to identify the time frame against which the standard is formulated.

Data reported by the institutions show that Texas public university campuses actually conducted some instructional activity in either classrooms, class laboratories or both until 10 p.m. on most weekday evenings during the Fall 1978 semester. Of the 23 public universities studied, only four showed no scheduled instructional activity during the 9 p.m to 10 p.m. period on weekday evenings. However, these four all conducted scheduled meetings from 8 p.m. to 9 p.m. on several weekday evenings. This would clearly indicate that the actual operating time frame for the public universities extends from 8 a.m. to 10 p.m. on the average weekday even though, as we will see in Chapter 2, the hours from 8 a.m. to 4:59 p.m. contain the heaviest concentration of scheduled instructional activity.

In terms of space availability and use, physical facilities operating costs are incurred for the hours that buildings are lighted and heated or cooled, irrespective of the specific use level during those hours. It is reasonable, therefore, to regard the lightly used evening hours as available institutional resources which are being paid for whether used efficiently or not. Consequently, the time frame used for analysis is the 70 hour week, and the weekly room hour standards for classrooms and class laboratories must reflect this time frame of available room hours.

Realistically, for most institutions the potential use of facilities hours beyond 5 p.m. is not proportionate to the use potential from 8 a.m. to 5 p.m. Factors of campus location, student body profile and program complexity create a variation from campus to campus in the useability of space

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in the evenings. Because of this consideration, the standards mentioned in the previous section are not proportionately as high as those for the 45 hour time frame used previously in Study Paper 12. That is, if the classroom standard (i.e., 30 WRH) based on 45 hours of availability were merely extrapolated to the 70 hour time frame, the new standard would be 46 WRH, and the corresponding class laboratory standard would be 30 WRH. Instead, the standards used here for 70 hours of weekly room use potential have been increased only one half of the proportional increment, i.e., 8 WRH (instead of 16) for classrooms and 5 WRH (instead of 10) for class laboratories, to 38 WRH and 25 WRH respectively.

Having adjusted the WRH standards to reflect the available potential of room hours from 5 p.m. - 10 p.m., as well as the lower marginal use potential of the evening hours, then, it is appropriate to evaluate the recorded WRH use of classrooms and of class laboratories by the new standards. In contrast to this chapter dealing with a measurement of the weekly use of rooms, the next chapter will examine the pattern of use of available rooms across the day from 8 a.m. to 10 p.m.

CHAPTER 2

HOURLY ROOM USE

PUBLIC FOUR-YEAR INSTITUTIONS

SUMMARY OF FINDINGS

The percentage of all available rooms in use each hour reveals both the level of room utilization (as in Chapter 1) and the pattern of utilization across the day.

The standards for this measure which correspond to those of Chapter 1 are 54 percent of available classrooms in use per hour, and 36 percent of available class laboratories.

The operating day time frame is fourteen hours per day, 8 a.m. to 10 p.m., five days per week because almost all of the public universities actually do schedule instructional activity until 10 p.m. daily.

Actual room utilization data reported by the public four-year schools show that for the average 8 a.m. to 10 p.m. weekday, 32.3 percent of all available classrooms and 23.5 percent of available class laboratories statewide are scheduled for use each hour. This means that by comparison with the respective standards, there is an hourly margin of 21.7 percent of available classrooms and 12.5 percent of available class laboratories statewide which could be employed in response to various types of demand.

Even comparing the utilization rates for the hours from 8 a.m. until 4:59 p.m. with the standards, there is a room use improvement potential of 10.6 percent of all available classrooms per hour, and 3.3

percent of available class laboratories on the average public four-year campus.

The lowest hourly utilization of classrooms over the full week on an individual campus is 17.4 percent (i.e., 36.6 of the 54 percent standard unused each hour)*; the corresponding rate for class laboratories is 15.9 percent (i.e., 20.1 of the 36 percent standard unused each hour).

The highest level of classroom use reported by a single institution for the full week is 45.5 percent per hour or 8.5 percent of available rooms below the standard. The corresponding figure for class laboratories is 32.8 percent, which is 5.2 percent per hour below the respective standard.

The data of Chapters 1 and 2 on the use of room units show a significant potential for the improvement of room use, not in relation to existing enrollments, programs and facilities, but as an alternative to the construction of new facilities in response to future demands on space.

* In refering to a portion of a standard which is unused, the marginal percent (i.e., 36.6 above) will always mean that percent of all available rooms, not that percent of the standard percentage.

CHAPTER 2

HOURLY ROOM USE

PUBLIC FOUR-YEAR INSTITUTIONS

How many classrooms and class laboratories are available on Texas' public university campuses during a semester, and to what extent and in what pattern are they being utilized?

Data collected by the Coordinating Board show that in any average hour, 32.3 percent of all available classrooms and 23.5 percent of all available class laboratories are in actual use, or conversely, that 67.7 percent and 76.5 percent respectively are not in use during each hour between 8 a.m. and 10 p.m. on the average weekday. Even during the portion of the day from 8 a.m. to 4:59 p.m. within which the public universities now concentrate the majority of their scheduled instructional activity, and on which basis utilization data from campus to campus is most directly comparable, the average hourly use of available classrooms is at a level of 43.4 percent, while 32.7 percent of available class laboratories are in use each hour.

For correct interpretation, these figures must be evaluated in relation to standards and not in relation to the use of 100 percent of all classrooms and class laboratories, which is an impossilbe goal. The standards for this measure of room use are 54 percent per hour for classrooms and 36 percent per hour for class laboratories, which are exactly proportional to the room unit use standards (i.e., WRH) presented in Chapter 1. The method of deriving these standards is described in a separate section of this Chapter.

In relation to a utilization standard of 54 percent of all available classrooms and 36 percent of all available class laboratories per hour, then, actual classroom utilization form 8 a.m. to 10 p.m. is short of the norm by an

average of 21.7 percent per hour of available classrooms statewide, and class laboratory utilization is 12.5 percent per hour lower than the standard. Again, even during the 8 a.m. - 4:59 p.m. portion of the day, classrooms are used an average of 10.6 percent of all available rooms per hour less than the standard and class laboratories 3.3 percent less.

The figures in Tables 2 and 3 show a sharp decline in the hourly percentage use of both available classrooms and available class laboratories after 5 p.m. on the average weekday, although as was pointed out in Chapter 1, almost all public universities scheduled some instructional activity until 10 p.m. on most weekdays. The following sections present detailed discussions of the data for classrooms and class laboratories based on a five day week, 8 a.m. to 10 p.m.

Classrooms

TABLE 2

AVERAGE HOURLY PERCENTAGES OF CLASSROOMS IN USE BY DAILY TIME SEGMENT

	8 a.m. to 10 p.m.	8 a.m. to 4:59 p.m.	5 p.m. to 10 p.m.	10 a.m. to 2:59 p.m.
MONDAY	35.6%	46.8%	15.6%	54.2%
TUESDAY	33.1%	42.1%	16.8%	51.5%
WEDNESDAY	35.4%	46.9%	14.7%	54.5%
THURSDAY	31.5%	41.3%	13.9%	50.7%
FRIDAY	25.8%	39.8%	0.7%	47.5%
AVERAGE - Monday-Friday	32.3%	43.4%	12.3%	51.7%
SATURDAY	1.0%	1.5%	0.1%	1.8%
Range by Institution Monday-Friday	14.3%-50.1%	17.6%-69.9%	0 - 43.1%	22.6%-82.4%

Note: Although Saturday data is not included in the "operating week" analysis, it is presented here for information purposes. Also, the line labelled "Range" contains, for each time segment, the lowest and highest average percentage for a single day by an individual institution (from Appendix B).

Table 2 indicates that at public universities, room use falls off sharply from 43.4 percent per hour during the 8 a.m. to 4:59 p.m. time segment to 12.3 percent during the 5 p.m. to 10 p.m. segment on the average weekday. Those figures mean that from 5 p.m. until closing time each weekday an average of 41.7 (53.3 on Friday) of the 54 percent use potential of all available classrooms statewide are empty and unassigned. The range of classroom usage varies considerably among institutions and time periods. Several institutions reported use of no classrooms from 5 p.m. to 10 p.m. on one or two weekdays. During the period from 10 a.m. to 2:59 p.m., however, one institution used an average of 82.4 percent of its classrooms hourly. The highest day-long average use by a single school (50.1 percent) occurs on Monday and the lowest (14.3 percent) on Friday.

According to individual institutional figures (not reprinted here), the highest actual percentage of classrooms used at one institution in a single hour was 100 percent, which occured at 11 a.m. Tuesday and Thursday. At another institution more than 75 percent of its available classrooms were used during 18 separate hourly periods during the week. Those 18 hours constitute 26 percent of the 70 time periods during which classes are conducted Monday through Friday. Few institutions approached this level of classroom use for a similar proportion of available time periods. The highest hourly use of classrooms by one public university for a single full day is 50.1 percent and for the full week the highest hourly level of use is 45.5 percent. Table 2 shows that the highest level of classroom use occurs from 10 a.m. through 2:59 p.m. daily.

The lowest hourly use of classrooms by one public university for the full week is 17.4 percent, which means that one campus is using an average of 36.6 percent fewer of its available classrooms than the 54 percent standard each hour during the 70 hour operating week. This is just the low extreme on a scale that "peaks" at 45.5 percent per hour, a top institutional level which is still 8.5 percent of available classrooms per hour lower than the standard. On Saturday, public universities use just one percent of all their classrooms across the full day, and no more than 1.8 percent per hour during any of the four time segments studied.

CLASS LABORATORIES

There is a key characteristic of class laboratories which should be considered before compaing their utilization with that of classrooms. The typical class laboratory is designed to meet a narrow range of discipline needs (i.e., music, microbiology, physical chemisty, etc.); because of physical layout and specialized permanent equipment, it cannot be usefully employed outside those disciplines. Also, laboratories or portions of laboratories are occasionally set up for a specific demonstration purpose and left set up for several days to preserve the experiment in progress. For these reasons, the utilization of class laboratories will generally be approximately one third lower than that of classrooms (as reflected in the WRH standards, Chapter 1).

The data in Table 3 reflect this characteristic; public university class laboratory use (23.5 percent) is slightly more than two-thirds of the classroom use level for the full week, although the overall pattern of class laboratory use is very similar to that of classrooms.

TABLE 3

AVERAGE HOURLY PERCENTAGES OF CLASS LABORATORIES IN USE BY DAILY TIME SEGMENT

	8 a.m. to 10 p.m.	8 a.m. to 4:59 p.m.	5 p.m. to 10 p.m.	10 a.m. to 2:59 p.m.
MONDAY	24.5%	33.9%	7.6%	34.3%
TUESDAY	27.2%	37.0%	9.6%	38.0%
WEDNESDAY	26.3%	36.4%	8.2%	36.5%
THURSDAY	24.9%	34.1%	8.5%	35.0%
FRIDAY	14.7%	22.2%	1.3%	23.6%
AVERAGE - Monday-Friday	23.5%	32.7%	7.0%	33.5%
SATURDAY	0.8%	1.2%	-0-	1.4%
Range by Institution Monday-Friday	0.9%-41.4%	1.4%-58.3%	0%-25.6%	2.6%-65.0%

As was the case with classrooms, Table 3 shows that the use of class laboratories at public universities falls off sharply from 32.7 percent per hour from 8 a.m. to 4:59 p.m. to 7 percent per hour from 5 p.m. to 10 p.m. on the average weekday. This means that from 5 p.m. until 10 p.m., five days a week, an hourly average of 29 (34.7 on Friday) of the 36 percent use potential of all available class laboratories statewide are empty and unassigned. There is a wide range of class laboratory utilization among institutions and time periods. Nine institutions use no class laboratories between 5 p.m. and 10 p.m. on Friday, and one of these uses only 0.9 percent of its available class laboratories all day Friday. In contrast, another institution uses an hourly average of 65 percent of its class laboratories between 10 a.m. and 2:59 p.m. on Wednesday, and 41.4 percent per hour for

all 14 hours on that same day! Overall, Tuesday is the weekday of highest hourly class laboratory use, and Friday - as for classrooms - shows the lowest hourly utilization.

Individual institutional figures show that one institution used 90 percent of its class laboratories at 2 p.m. on Tuesday, the highest utilization for a single hour. Another used more than 50 percent of its class laboratories during 19 separate hourly periods Monday through Thursday. No other institution approached this level of class laboratory use for as many separate periods. The highest hourly use of class laboratories by one public university for a single full day is 41.4 percent, and for the full week, the highest hourly level of use is 32.8 percent. Table 3 also indicates that the highest average level of class laboratory use occurs from 10 a.m. to 2:59 p.m. daily.

The lowest hourly use of class laboratories on one public university campus for the full week is 15.9 percent. This means that one institution is using an average of 20.1 percent fewer of its available class laboratories than the 36 percent standard each hour of the 70 hour operating week. This is again only the low end of a range that "peaks" at 32.8 percent, a level of highest recorded use which is still 3.2 percent below the norm. As with classroom use, the use of class laboratories on Saturday is negligible.

Some schools are beginning to argue that cutting the scheduled use of facilities to four days a week will reduce utility costs and student and faculty travel cost. This may be true, but if the shorter week creates a need for more rooms to accomodate scheduled classes during the 8 a.m. to 5 p.m. peak load hours, the cost of new construction and subsequent building operating costs will more than offset the savings realized. On the

other hand, if scheduled instruction is distributed more evenly over the day from 8 a.m. to 10 p.m. for four weekdays, the data of this study suggest that current enrollments and class offerings can be accomodated with existing facilities, and that the savings generated by the shortened week can thus be preserved.

CONCLUSIONS

The data in Chapters 1 and 2 measure the utilization of room units. Both analyses, in relation to standards of utilization for both classrooms and class laboratories based on established hours of scheduled instructional activity, indicate a significant potential for the improved utilization of existing facilities.

In considering this conclusion, it should be remembered that the standards used in this study are not being presented as goals to be reached now, with present enrollments, programs and facilities. Obviously, if present classes are spread more evenly over the hours from 8 a.m. to 10 p.m. five days per week, the net result in hourly room use percentages will be the same and only their distribution will change.

Viewing the standards as realistic goals is valid, however, when the increased room use potential they suggest is viewed as an alternative to the new construction of buildings to meet apparent space needs. The purpose of this study is to point out that the optimum utilization of space which has already been built and is currently being operated at the taxpayers' expense can and should be achieved as a prior condition to the long-term investment in new facilities.

The following example illustrates the potential benefit of increased utilization using the data of this Chapter:

If all 23 universities used their classrooms at the standard hourly rate of 54 percent instead of the present 32.3 percent, an additional 797 classrooms would be in use statewide each hour or, an additional 55,790 classroom hours per week would be made available at no additional capital cost to the institutions or the taxpayer. Similarly, an hourly increase in the use of class laboratories from 23.5 percent to 36 percent would place another 197 class laboratories in use each hour, adding 13,790 hourly periods of use each week. At an estimated annual operating cost per square foot of $4.63, the approximate monetary benefit from this improvement in use alone would be $3,802,883 per year.*

Note: Employing the procedure used above, but measuring improvement merely to the level of the current highest hourly usage by a single institution for the full week, the potential benefit would be 485 classrooms and 147 class laboratories per hour statewide for an estimated annual dollar benefit of $2,432,669.

UTILIZATION STANDARDS

It was mentioned that weekly room hours and hourly percentage of room use are merely two measures of the same quantity, room unit use. The standards for the two measures, then, should be in direct proportion to one another. Having already derived Weekly Room Hour standards in Chapter 1, the following method is used to determine hourly room use standards at the corresponding level for Chapter 2:

Given-
100 CLASSROOMS
100 rooms x 38 WRH = 3,800 hours
100 rooms x 70 total weekly hours = 7,000 hours
3,800 divided by 7,000 = .54, or a 54% hourly room use rate.

* The estimated operating cost per square foot of E & G space is derived from actual 1978 expenditures for physical plant services, maintenance and utilities. The estimated annual dollar benefit is based on the average square feet per classroom and class laboratory from facilities inventory data.

Given-
50 CLASS LABORATORIES
50 rooms x 25 WRH = 1,250 hours
50 rooms x 70 total weekly hours = 3,500 hours
1,250 divided by 3,500 = .36, or a 36% hourly room use rate.

METHODOLOGY

To describe both the availability of a campus' instructional facilities and the level of use they receive, the most basic common denominator is the number of rooms of certain types which the campus possesses. Of all rooms assigned and used for instruction, the great majority are either classrooms or class laboratories. There are two potential sources from which to determine the total number of available rooms of these types: the Coordinating Board Facilities Inventory in which all the rooms on each campus are identified by room type, and the Building and Room Report in which all rooms of various types assigned for class meetings during each Fall Semester are recorded. The latter option was chosen as the source of data for this study because the Building and Room Report contains information on room type and class duration exactly as it was reported by each institution for the specific semester under study.*

The first step in the analysis is to establish the total number of rooms of each type available for use. To do this, each room reported as scheduled, whether for one class or fifty, was counted only once. The next step was to extract from the data the number of each type of room actually in in use during each hour of the day. The operating day for study purposes

* It is anticipated that in future evaluation of classroom and class laboratory use, the total numbers of rooms available will be obtained from each institution's Physical Facilities Inventory. The current inventory shows more classrooms at 17 of the 23 institutions and more class laboratories at all of the schools studied than are shown as scheduled on the Building and Room Report. No attempt is made in this study to measure the hourly use of rooms against these higher numbers of rooms of each type available, however.

begins at 8 a.m. and continues until 10 p.m. The program for obtaining the data from the computer file was designed to take into account class duration, so that a class beginning at 9 a.m. and continuing until 10:50 a.m. will register room use at both 9 a.m. and 10 a.m. It was thus possible to divide the number of rooms of each type scheduled at each hour of the day by the total number of rooms of that type available for use to obtain the percentage of total rooms used during each hour.

CHAPTER 3

STUDENT STATION USE

PUBLIC FOUR-YEAR INSTITUTIONS

Chapter 3

SUMMARY OF FINDINGS

While Chapters 1 and 2 examine the use of room units during available hours, Chapter 3 looks at the internal use of the rooms, that is the percentage of their available student stations (i.e., seats, lab stations, etc.) which are occupied when the rooms themselves are in use.

The standard for the occupancy of classroom stations is 66 2/3 percent, and that for class laboratories is 80 percent. These standards are used nationwide. Standards for station area (i.e., the size of the average student station) are: 16.5 square feet for classrooms, and 40 square feet for class labs.

In their occupancy of the average classroom's student stations, the four-year institutions are below the 66 2/3 percent standard with a rate of 56.1 percent. The lowest classroom occupancy rate for a single institution is 42.5 percent. The highest is 70.1 percent. The corresponding figures for class laboratories are: average occupancy - 79.9 percent; lowest institutional rate - 65.5 percent; highest institutional rate - 117.7 percent (all of the above rates have been adjusted to reflect station area efficiency).

The average area of student stations in classrooms is 16.4 square feet (compared to a nationally accepted standard of 16.5 square feet), and the average class laboratory student station occupies 38 square feet (in relation to a standard of 40 square feet). Both of these figures are more efficient than the appropriate standard.

Although the internal use of rooms indicated by the data is superior in relation to relevant standards to the use of room units described in the two previous chapters, there is significant margin for improved utilization in this respect as well.

CHAPTER 3

STUDENT STATION USE

PUBLIC FOUR-YEAR INSTITUTIONS

The average use at Texas public universities of "seating capacity" or student stations within classrooms and class laboratories is closer to accepted statewide utilization standards than was the room unit utilization analyzed in Chapter 1 and 2, but there is still room for significant improvement. In contrast to the measures of room utilization described in the first two chapters, this measure provides insight into the efficiency of the internal employment of classroom and class laboratory square feet, and of the internal use of these rooms when a class is in session.

Ideally, an institution should strive for a combination of high room unit and high student station use. The student station aspect of utilization may be thought of as the second half of what has been called a university's facilities utilization potential.

What proportion of the average classroom's and class laboratory's seating capacity, i.e., total student stations, is in use when each room is occupied? A direct answer to this question may be obtained by dividing the average classroom and the average class laboratory class size (enrollment) by the respective average total capacities for these room types. The resulting ratios (expressed as percentages) will indicate the efficiency of student station use irrespective of the amount of time the rooms are in use.

In addition to the direct measure of station use, average station size (i.e., area) must be considered. Excessive station size generally indicates that more student stations per room is a feasible goal; more

stations mean greater enrollment capacity from a given number of facilities square feet (subject, of course, to an optimum distribution of room capacities in relation to desired class sizes and program needs).

Station area also has a direct bearing on station occupancy in that an institution whose classroom or class lab stations are larger on the average than the respective standards will have fewer than optimal stations per room. Consequently, that institution will occupy a higher proportion of its average room's stations than would be occupied were an appropriately larger number of stations available per room. Because of this interrelationship between station size and station occupancy, the tables in this chapter and in Appendix C contain a column of occupancy rates which have been adjusted to reflect station size efficiency. The adjusted occupancy rates are also used in the narrative.

The standards for station use in Texas, as designated in Study Paper 12 (page 15), are 66 2/3 percent for classrooms and 80 percent for class laboratories.* That means, for example, that the average class, wherever it is held, would occupy 66 2/3 percent of the seats in the classroom

* The Facilities Inventory and Utilization Study, 1978, published by the North Carolina State Commission on Higher Education Facilities, bases its analysis of classroom and class laboratory student station utilization on standards of 60 percent and 80 percent respectively. California uses a classroom occupancy standard of 66 percent, and standards for class laboratories of 80 percent (graduate level) and 85 percent (undergraduate level).

Class size data for this analysis were obtained from the Building and Room Report and room capacity and student station size data were obtained from the Coordinating Board Facilities Inventory.

or 80 percent of the seats (stations) in the class laboratory. Study Paper 12 also presents a "recommended planning" classroom station size of 16.5 square feet. For class laboratories, it suggests a range of station sizes for 10 program areas from 25 square feet (language) to 100 square feet (engineering, and technical and vocational education). Since this range involves several discipline areas with a greatly varying proportional use of facilities, the standard for this study will be 40 square feet per student station.* An analysis of the data follows; Appendix C contains institutional data.

TABLE 4

STATION OCCUPANCY AND STATION SIZE

	AVERAGE CLASS SIZE	AVERAGE ROOM CAPACITY	AVERAGE PERCENT OCCUPANCY	AVERAGE STATION AREA SQ.FT.	ADJUSTED PERCENT OCCUPANCY
CLASSROOMS	27.1	48.6	(55.8%)	16.4	56.1%
INSTITUTIONAL RANGE	20.2 - 32.5	30.4 - 59.5	41.7% - 79.5%	13.6 - 21.3	42.5% - 70.1%
CLASS LABORATORIES	19.8	26.1	(75.9%)	38.0	79.9%
INSTITUTIONAL RANGE	15.8 - 23.3	17.4 - 42.0	55.0% - 100%	26.4 - 53.8	65.5% - 117.7%

As shown above, Texas four-year institutions collectively use an adjusted average of 56.1 percent, slightly less than 66 2/3 percent standard, of availabile classroom student stations during the average class meeting. Twenty of the 23 universities studied are below that standard. The use of class

* The North Carolina study mentioned previously also uses a class laboratory station area standard of 40 square feet. While no single standard can reflect the wide variety of specific discipline station areas, the historical data nationwide supports the reasonableness of the 40 square foot standard.

laboratories is much better, the present adjusted utilization rate of 79.9 percent virtually matching the 80 percent standard. However, eleven of the 23 universities use a lower proportion of their class laboratories' student stations than the Texas standard.

The data further indicates that the average size of classroom student stations - that is, the amount of square footage per station - almost matches the statewide standard of 16.5 square feet.

The average public university class laboratory student station occupies only 38.0 square feet which is also somewhat below and therefore more efficient than the 40 square foot standard for class lab stations.

The figures for both classrooms and class laboratories show the average internal use of rooms to be slightly lower than the respective utilization standards. This would indicate generally that in planning for greater facilities utilization, Texas' public universities can focus productively on the internal use of rooms as well as on the room unit use potential discussed in Chapters 1 and 2.

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CHAPTER 4

FACILITIES UTILIZATION BY PUBLIC UPPER-LEVEL INSTITUTIONS

Chapter 4

SUMMARY OF FINDINGS

This chapter applies the same utilization measures used in the first three chapters to the five public upper-level schools. The respective standards are also the same.

On all three indices of facilities use the upper-level sector uses its space less efficiently than the public university.

For the average week, 8 a.m. to 10 p.m. Monday through Friday, classrooms are used an average of 16 hours per room (WRH) and class laboratories are in use 9.1 hours per room per week. The highest figure for one campus is 21.5 WRH for classrooms and 11.6 WRH for class laboratories; the lowest figures are 12.2 WRH for classrooms and 6.4 WRH; for class laboratories (standards are: classroom - 38 WRH: class laboratories - 25 WRH).

In terms of percentages of available rooms used per hour during the average weekday from 8 a.m. to 10 p.m., classrooms are used at a rate of 22.9 percent and class laboratories at 13 percent. During the upper-level peak use segment from 6 p.m. - 10 p.m., 38.9 percent of available classrooms and 14.7 percent of available class laboratories are actually scheduled. All of these rates are well below the respective standards of 54 percent and 36 percent per hour.

In its occupancy of classroom and class laboratory student stations when the rooms are in use, the upper-level sector's 46.4 percent use of

classroom stations is well below the corresponding rate for public universities, as is its class laboratory occupancy rate (53.0 percent). Both rates are below the respective standards of 66 2/3 percent and 80 percent. In size, both the average classroom and class lab station areas are significantly larger than the respective standards (i.e., less efficient).

The overall utilization of classrooms and class laboratories by the upper-level institutions indicates that this sector of public higher education has an even greater potential than the public four-year sector for improving the use of its existing facilities. This is not altogether unexpected since these newer institutions were built in anticipation of student enrollment levels which are still developing. Nevertheless, the construction of additional new facilities for this sector should be carefully evaluated before proceeding. Particular care should be taken not to build more facilities to respond to peak load use when better scheduling of classes can make adequate existing space available.

CHAPTER 4

FACILITIES UTILIZATION BY PUBLIC UPPER-LEVEL INSTITUTIONS

The first three chapters have discussed three methods of measuring facilities utilization and have applied them to the public four-year universities. These same measures are applied in this chapter to the use of facilities by Texas public upper-level institutions. The data for the upper-level sector according to all three measures, reveal that the average upper-level institution operates at a lower level of efficiency in facilities utilization than the average public university. Consequently, an even stronger argument can be made for improved facilities use versus new construction in this sector of public higher education than has already been made in relation to the public university sector. Institutional data for the upper-level schools is contained in Appendix D.

AVERAGE WEEKLY ROOM HOURS

The average Weekly Room Hour utilization at upper-level institutions for classrooms is 22 hours per room per week lower than the 38 WRH standard, while class laboratory use is 15.9 WRH below the respective standard of 25 WRH. The corresponding differences between upper-level room use and the relatively higher WRH figures of the public universities are 6.6 WRH for classrooms and 7.4 WRH for class laboratories.

TABLE 5

AVERAGE HOURS OF ROOM USE PER WEEK (WHR)

	AVERAGE WRH	INDIVIDUAL INSTITUTIONAL RANGE
CLASSROOMS	16.0 WRH	12.2 WRH - 21.5 WRH
CLASS LABORATORIES	9.1 WRH	6.4 WRH - 11.6 WRH

HOURLY ROOM USE PERCENTAGES

An average of only 22.9 percent of upper-level classrooms and 13 percent of available class laboratories are in use each hour during the 70-hour week as shown in Table 6. The use rate for classrooms increases steadily toward the latter portion of the average weekday. Class laboratories, on the other hand, are used at an almost constant rate throughout the day.

TABLE 6

HOURLY PERCENTAGES OF ROOM USE BY DAILY TIME SEGMENT

CLASSROOMS:

	8 am - 10pm	8 am - 4:59 pm	5 pm - 10 pm	6 pm - 10 pm
MONDAY	25.4%	16.9%	40.7%	46.6%
TUESDAY	28.5%	18.5%	46.8%	54.9%
WEDNESDAY	26.9%	18.3%	42.2%	47.8%
THURSDAY	24.6%	17.5%	37.6%	44.6%
FRIDAY	8.9%	13.7%	0.3%	0.4%
AVERAGE-Monday-Friday	22.9%	17.0%	33.5%	38.9%
SATURDAY	0.8%	1.2%	0.0%	0.0%
Range by Inst. Monday-Friday *	5.9%-45.9%	9.2%-31.5%	0.0%-83.3%	0.0%-97%

CLASS LABORATORIES:

	8 am - 10pm	8 am - 4:59 pm	5 pm - 10 pm	6 pm - 10 pm
MONDAY	16.4%	15.8%	16.6%	18.3%
TUESDAY	14.2%	12.5%	17.5%	18.8%
WEDNESDAY	17.8%	17.7%	18.8%	21.1%
THURSDAY	13.3%	12.5%	14.4%	15.2%
FRIDAY	3.1%	4.8%	0.0%	0.0%
AVERAGE-Monday-Friday	13.0%	12.7%	13.5%	14.7%
SATURDAY	0.3%	0.5%	0.0%	0.0%
Range by Inst. Monday-Friday *	0.0%-24.4%	0.0%-24.4%	0.0%-45.7%	0.0%-53.5%

* These figures represent the lowest and highest percentages for a single weekday by an individual institution during each time segment.

The "peak use" period for classrooms and class laboratories occurs from 6 p.m. to 10 p.m. in the upper-level sector reflecting the attendance preferences of the generally "older than average," working student body which characterizes those institutions.

The full-day range of hourly classroom utilization by a single institution runs from a low one-day rate of 5.9 percent per hour on Friday, to a high of 45.9 percent on Tuesday. The corresponding figures for class laboratories are 0.0 percent on Friday and 24.4 percent on Wednesday. Even from 6 p.m. to 10 p.m. the classroom utilization at two institutions was zero on Friday and the class laboratory rate was zero at another on Thursday, and at all five schools on Friday.

In other words, on the average weekday 31.1 of the 54 percent useable potential of available classrooms and 23.0 of the 36 percent useable potential of all class laboratories on the public upper level campuses are not in use. During the key evening hours from 6 p.m. to 10 p.m., an average of 15.1 of the 54 percent standard of all classrooms (53.6 of 54 percent on Friday) and 21.3 of the 36 percent standard of all class laboratories (zero use on all five campuses on Friday) are empty and unassigned.

In relation to the public four-year utilization figures presented in Chapter 2 for this measure, the average full-week utilization of classrooms and class laboratories by upper level institutions is 9.4 percent of available classrooms and 10.5 percent of available class laboratories per hour below the corresponding levels of public four-year room use.

STUDENT STATION USE

The collective usage of seating capacity in classrooms (46.4 percent) and class laboratories (53.0 percent) at upper-level institutions does not meet

the respective statewide standards of 66 2/3 percent and 80 percent, and all five campuses in this group are below the classroom occupancy standard, while four of the five are below the class laboratory norm. This means that when classrooms and class laboratories are scheduled, the student stations in the rooms are not used as efficiently as might be expected.

In terms of space, the average upper-level classroom student station is 4.5 square feet larger than the 16.5 square foot standard resulting in relatively fewer stations per room. In fact the lowest institutional average for square footage per classroom station is still above the standard. The average upper-level class laboratory student station area is 11.9 square feet larger than the 40 square foot standard, although one campus disproportionately affects the mean with an average class lab station area more than double the 40 square foot standard.

TABLE 7

STATION OCCUPANCY AND STATION SIZE

	Average Class Size	Average Room Capacity	Average Percent Occupancy	Average Station Area Sq.Ft.	Adjusted Percent Occupancy
CLASSROOMS	19.6	33.2	59.0%	21.0	46.4%
INSTITUTIONAL RANGE			51.3% - 71.7%	16.8 - 26.0	35.3% - 61.9%
CLASS LABORATORIES	13.2	19.2	68.8%	51.9	53.0%
INSTITUTIONAL RANGE			52.5% - 96.5%	41.2 - 85.2	36.2% - 93.7%

GENERAL CONCLUSIONS

In the utilization of their classroom and class laboratory facilities, the upper level institutions are less efficient in all three measurement indices,

Weekly Room Hours, Hourly Percentage of Room Use, and Student Station Use, than the four-year universities. At only one point are the data closely comparable, for the percentage of classroom and class laboratory use after 5 p.m., where the upper-level institutions predictably exceed the public university usage rates. This does not, however, significantly alter the conclusion stated in the first paragraph of this chapter.

In the general comparision of facilities utilization data, the average upper-level institution is significantly below its public university counterpart. Therefore, a potential for improved utilization as an alternative to new construction exists for the public upper-level sector to an even greater degree than for public universities.

CHAPTER 5

FACILITIES NEED ASSESSMENT

SUMMARY OF FINDINGS

Chapter 5 presents an educational and general (E and G) space need projection model which estimates the quantitative need for new construction at the 28 campuses in this study. The model incorporates the following variables:

(a) Role and scope variations among institutions; the 28 institutions are differentiated into 5 groupings, each with a different E and G square feet per student designated value;

(b) Total E and G square feet existing and in the process of being built;

(c) The actual utilization of classrooms and class laboratories, and of their student stations; and

(d) Projected full time student equivalent enrollments in 1987.

The model projects the following levels of new space need:

14 of the 28 universities will need a total of 3,963,412 E and G square feet through 1987.

CHAPTER 5

FACILITIES NEED ASSESSMENT

THE QUESTION OF SPACE NEED

It seems both useful and appropriate in a study of this nature to relate the foregoing discussion of space utilization to the question of space need, the ultimate purpose of utilization analysis. Consideration of facilities space need must be based on a number of factors. Standards of size and design constitute one set of parameters, variations in program complexity another. The registrar is primarily concerned with room units available and with times of availability and use. The professor and student are often most affected by the relative desirability of the times of day classes are scheduled and the location and proximity of the "spaces" they must use, as well as their inherent useability and unique functions. The campus planner focuses on the integrated pattern of facilities development, and the administrator is concerned with all of these factors plus the management of construction and operational funding for facilities. From these and other factors and combinations of factors come varying and often conflicting judgments of space needs.

As costs for construction, maintenance and custodial services and energy continue to play an increasingly prominent role in estimates of facilities need, actual, unavoidable and documented "needs" rather than rationalized "wants" must become the basis for new construction projects.

When one speaks of documenting facilities need, the fundamental quantity or datum of analysis is square feet. This "quantity" subsumes: (1) number of

room units in a given amount of space, (2) types of rooms and (3) internal configuration of the rooms (e.g., square feet per student station).* These sub-elements of space quantity are subject to use-analysis, but they are shaped by the role and scope of the individual institution, making them most amenable to study by each institution's internal administration.

To insure objectivity and avoid entanglement in competing and conflicting demands within institutions for facilities, any statewide approach to overall need analysis must focus on square feet per se. Determination of the overall need for new space is aided by analysis of the contributing factors, but the final decision on how to balance those factors rests with each institution.

THE PARAMETERS OF NEED ANALSIS

The question before a central administrative agency like the Coordinating Board in assessing the need for new facilities is, "How much space does a specific public senior college or university have, and how much does it need?" The most basic determinant of space need is the quantity of Educational and General space dictated by each institution's role and scope. Substantial differences exist among the roles and scopes of Texas public universities and basic differences in need must be delineated before institutional space requirements can be established. Equity in institutional facilities does not demand equal amounts of square feet per full time student for all public senior institutions because all are not alike or "equal" in their basic requirements for space. So a determination of overall space needs for vary-

* Appendix E presents a breakdown of E & G space into several of the discrete categories which it includes, and shows the variation in the internal distribution of these at the institutions in this study.

ing roles and scopes becomes essential.

An assessment of quantities of existing space is the next component of any valid approach to determining both institutional and statewide needs. The Coordinating Board maintains this data in its Facilities Inventory, which is based on institutional reports. Square footage in projects already approved and funded or in progress also must be added to inventory totals.

Historical data shows that an apparent space "shortage" or "surplus" indicated by inventory data does not necessarily correlate with corresponding space utilization data, such as that contained in earlier chapters. Often, one institution with relatively more square feet per student than another uses its space more rather than less efficiently than the other as one might assume. Utilization efficiency, then, is the third component of space need. It serves as a variable by which to adjust "raw" facilities needs to their relative, yet objective level in relation to the actual use of existing space.

A MODEL FOR ASSESSING FACILITIES NEEDS

The determination of facilities needs, based on the parameters outlined above, may be approached in terms of a model. Table 8 shows the method used in this study to accomplish the first prerequisite of space need determination, a differentiation among institutions on the basis of role and scope according to facilitites-related factors.

Each institution is allocated points for each factor in the following manner:

(1) An institution's raw data for each factor is divided by the total data for that factor;

(2) The factor's total points are then multiplied by the resulting percentage to produce the institutional factor "score" (the final result is the distribution of 100 points per factor category among all of the schools in the analysis);

(3) Each institution's total point score is the sum of all seven factor scores.

The seven facilities-related role and scope factors and an explanation of each are:

Space - Heavy Programs (Factors 1 and 2):

These are program areas which inherently require large quantities of square feet based on program-related space factors contained in Coordinating Board Study Paper 12. The programs with the four highest space factors were chosen. (physical education was disregarded because of its universal nature). The four space-heavy programs are: agriculture, engineering, industrial arts/education, and technical and vocational. These four program areas are felt to be particularly appropriate because although every institution does not have all four, none are exclusive to very large or very small institutions. The raw data of factor one are total undergraduate semester credit hours (SCH) in the four program areas. Factor two uses total graduate level SCH in the same four areas. Factor 2 is assigned 60 total points to 40 for factor 1 because graduate work generally requires more square feet per student than undergraduate.*

* A regression analysis of this model has actually shown final total point results to be insensitive to varying point distributions among the seven factors.

TABLE 8

ROLE AND SCOPE CATEGORIES BASED ON SPACE NEED FACTOR RANKING

	SPACE HEAVY PROGRAMS				TOTAL FTSE ENROLLMENT		GRADUATE PROGRAM				RESEARCH ACTIVITY					
	FACTOR 1 (40 pts.)		FACTOR 2 (60 pts.)		FACTOR 3 (100 pts.)		FACTOR 4 (60 pts.)		FACTOR 5 (40 pts.)		FACTOR 6 (50 pts.)		FACTOR 7 (50 pts.)			
	Undergrad. Level		Graduate Level						77-78							
Institution	SCH	Pts.	SCH	Pts.	Fall 78 FTSE	Pts.	Fall 77 SCH	Pts	Degr. Prod.	Pts.	Research Sq.Ft.	Pts.	Research Dollars	Pts.	Total Pts.	Designated E&G Sq.Ft. Per FTSE
Univ. of Texas at Austin	45,514	6.19	10,329	14.98	35,923	14.45	83,154	11.96	2,521	6.73	1,414,463	23.33	$ 50,818,164	17.02	94.63	132
Texas A&M University	94,942	12.90	11,448	16.60	28,127	11.32	43,858	6.31	1,245	3.33	484,263	7.99	60,079,828	20.12	78.57	132
Univ. of Houston	18,980	2.58	5,548	8.05	20,849	8.39	59,845	8.61	1,446	3.86	324,493	5.35	9,112,184	3.05	39.89	114
Texas Tech University	34,162	4.64	2,518	3.65	19,459	7.83	21,748	3.13	777	2.08	412,796	6.81	8,394,549	2.81	30.95	114
Univ. of Texas-Arlington	22,743	3.09	5,186	7.52	13,716	5.52	19,721	2.84	457	1.22	72,275	1.19	1,121,728	.38	21.76	114
North Texas State Univ.	2,928	.40	153	.22	12,961	5.21	27,076	3.90	1,115	2.98	72,195	1.19	2,423,764	.81	14.71	114
Univ. of Texas-El Paso	7,766	1.06	683	.99	11,796	4.75	7,069	1.02	274	.73	39,820	.66	1,180,273	.40	9.61	100
East Texas State Univ.	3,890	.53	672	.97	6,347	2.55	19,729	2.84	834	2.23	1,438	.02	249,567	.08	9.22	100
Southwest Texas State	5,180	.70	63	.09	12,913	5.20	8,548	1.23	397	1.06	8,746	.14	516,647	.17	8.59	100
Sam Houston State Univ.	6,555	.89	795	1.15	9,458	3.81	7,065	1.02	454	1.21	5,949	.10	410,129	.14	8.32	100
Stephen F. Austin State	6,550	.89	312	.45	8,923	3.59	8,149	1.17	629	1.68	10,236	.17	740,796	.25	8.20	100
Lamar University	10,899	1.48	931	1.35	8,555	3.44	4,748	.68	252	.67	7,341	.12	447,283	.15	7.89	100
Texas Woman's Univ.	-0-	0	-0-	0	5,428	2.18	17,028	2.45	680	1.82	57,034	.94	882,701	.30	7.69	100
Texas A&I Univ.	9,023	1.23	853	1.24	4,929	1.98	4,920	.71	455	1.22	6,965	.11	623,358	.21	6.70	100
Prairie View A&M	8,067	1.10	414	.60	4,444	1.79	8,714	1.25	493	1.32	5,122	.08	1,278,567	.43	6.57	100
Texas Southern Univ.	2,302	.31	147	.21	6,850	2.76	10,208	1.48	360	.96	8,687	.14	784,586	.26	6.12	100
UT- San Antonio	492	.07	498	.72	5,945	2.39	9,033	1.30	390	1.04	13,270	.22	1,603,475	.54	6.28	100
West Texas State Univ.	3,796	.52	395	.57	5,149	2.07	4,935	.71	221	.59	10,356	.17	612,281	.21	4.84	93
Pan American Univ.	-0-	0	-0-	0	6,011	2.42	3,693	.53	262	.70	1,724	.03	405,274	.14	3.82	93
Tarleton State Univ.	5,055	.69	129	.19	2,754	1.11	2,790	.40	159	.42	735	.01	29,258	.01	2.83	93
Angelo State University	976	.13	79	.11	4,483	1.80	1,664	.24	85	.23	11,161	.18	181,491	.06	2.74	93
Sul Ross State Univ.	3,058	.42	151	.22	1,513	.61	2,504	.36	177	.47	6,633	.11	93,266	.03	2.22	93
Midwestern State Univ.	-0-	0	-0-	0	3,192	1.28	1,548	.22	85	.23	6,139	.10	88,702	.03	1.86	93
Univ. of Texas - Dallas	-0-	0	109	.16	2,819	1.13	13,108	1.89	292	.78	47,178	.78	6,925,359	2.32	7.06	100
Univ. Houston - C.L.C.	-0-	0	-0-	0	2,557	1.03	16,043	2.31	479	1.28	-0-	0	152,816	.05	4.67	93
Corpus Christi State Univ.	-0-	0	-0-	0	1,430	.58	4,984	.72	232	.62	2,040	.03	122,737	.04	1.98	93
UT - Tyler	696	.09	-0-	0	1,098	.44	2,598	.37	110	.29	-0-	0	2,959	0	1.18	93
UT- Permian Basin	774	.11	33	.05	907	.37	2,510	.36	96	.26	-0-	0	32,535	.01	1.16	93
TOTALS	294,348		41,446		248,536		416,990		14,977		3,031,059 sq.ft.		$149,314,277			

Full-Time Student Equivalent Enrollment (Factor 3):

A factor based on full-time student equivalent enrollment (all levels) from the most recent Fall Semester is included here because there is a positive correlation between full-time enrollment and space need per student (i.e., more students create greater density, traffic problems, room-use turnover problems, etc.).

Graduate Activity (Factors 4 and 5):

These factors measure an institution's level of graduate instructional activity in all program areas. Factor 4 measures total fall semester SCH generated beyond the baccalaureate level, and Factor 5 measures degree production beyond the baccalaureate level for the most recent school year. Because graduate work inherently requires more space per student than undergraduate studies, a determination of space needs related to role and scope must include this variable. Factor 4 is assigned 60 points while Factor 5 is assigned 40 points because SCH have greater impact on space needs than do degrees awarded.

Research Activity (Factors 6 and 7):

These factors measure institutional "research activity" both by square footage (Factor 6) and by total funds from all sources (Factor 7) devoted to research. These two measures are complementary rather than duplicative since, although they are often clsoely correlated, a positive correlation does not always exist. Research activity, however, does create a space need separate from other university activities. Each factor is assigned 50 points.

The results of this factor ranking process are shown by the point

totals in the left-hand column in Table 8 which lists the institutions in descending order by total point score. No assumption of institutional quality is implied. The point scores and the positions of institutions in the list merely relflect quantitatively demonstrated differences in types (i.e., roles and scopes) of institutions. Alothough a quantitative representation of varying space need is suggested by the point scores, these scores in themselves do not indicate amounts of space required. The whole process to this point is for the sole purpose of letting present space-related program activities at the schools describe the role and scope differences among them. Space standards or "designated square feet" of educational and general (E & G) space per full-time student appear in the far right-hand column of Table 8.

The standards for square footage originated with a 1969 U.S. Office of Educations report, the most recent study of space need standards available.* That study showed three educational and general (i.e., "total academic") space standards by type of institution:

"University" (broadest in scope, most complex)	132 square feet/FTSE
"University and 4-Year"	114 square feet/FTSE
"4-Year (narrowest in scope and/or least complex)	93 square feet/FTSE

These three space standards appear to correlate with "natural" point-rank groupings of Texas institutions derived by the process described above. Three groupings, however, are inadequate to capture the diversity of roles and scopes that exists within the spectrum of Texas higher education. Therefore, two other groupings were dictated within the point ranking structure.

* Federal Support for Higher Education Construction: Current Programs and Future Needs, Table F-1

One is an intermediate grouping between the second and the third groups. This added grouping contains institutions which generally do not conduct the levels of activity of the two highest-scoring groups but whose activities require more space than those of the lowest scoring group. The designated E & G figure for this group was set at 100 square feet.

The second added group separates the upper-level institutions as unique by type and mission. Because the total point scores of this last group are discontinuous with the descending order of the scores of institutions in the other four groupings, each school in this group is assigned the designated E & G square foot figure of its nearest point score counterpart in the preceding groups.

Adjustments in the individual factor point maximums, even when rather substantial, may change the order of some schools within groups, but they will not change the basic grouping order. Although it would be more convenient to have large total point gaps between groups, the groups themselves must be examined for internal integrity and for intergroup distinctions which are supported, if considered objectively, by non-quantitative judgement.

With the first requirement of space need analysis satisfied, it is possible to directly confront the questions: "How much space does each school have?" and "How much space does each school need?" An outline of the solution provided by this model is contained in Table 9, which supplies the data for calculating the cumulative deficit in educational and general space to fall 1987. An explantion of the data and methods used in this calculation follows:

Columns 2 and 3: The raw amount of space an institution needs under this conceptual approach is the product of its FTSE enrollment (Col. 2)

TABLE 9

PROJECTION OF SPACE NEED IN EDUCATIONAL AND GENERAL SQUARE FEET TO FALL 1987

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
					Deficit (-) or Surplus (+) E&G Square Feet				Adjusted Deficits		Percent of Total Deficit	
Institution	Fall 1987/FTSE Enrollment	Designated Sq. Ft.	Present & In Progress E&G Sq. Ft.*	Formula E&G Sq. Ft.	NON-PUF	PUF	Efficiency Factors	Present Unused E&G Space	NON-PUF	PUF	NON-PUF	PUF
UT-Austin	36,360	132	5,111,857	4,799,520		+312,337	.076	388,501		-0-		
Texas A&M Univ.	31,190	132	2,882,033	4,117,080		-1,235,047	.098	282,439		-952,608		69.78
North Texas St. Univ.	15,847	114	1,509,588	1,806,558	-296,970		.086	129,825	-167,145		6.43	
Texas Tech Univ.	21,157	114	2,498,489	2,411,398	+ 86,591		.054	134,918	-0-			
Univ. of Houston-Main	23,832	114	2,480,317	2,716,848	-236,531		-.017	(-42,165)	-236,531		9.10	
UT-Arlington	15,917	114	1,224,018	1,814,538	-590,520		-.019	(-23,256)	-590,520		22.73	
East Texas State	8,705	100	856,958	870,500	- 13,542		.204	174,819	-0-			
Lamar University	9,710	100	864,070	971,000	-106,930		.135	116,649	-0-			
Prairie View A&M	5,225	100	509,446	522,500		- 13,054	.119	60,624		-0-		
Sam Houston St. Univ.	11,089	100	858,269	1,108,900	-250,631		.146	125,307	-125,324		4.82	
Southwest Texas St. U.	15,863	100	884,347	1,586,300	-701,953		.041	36,258	-665,695		25.62	
Stephen F. Austin	10,618	100	785,871	1,061,800	-275,929		.139	109,236	-166,693		6.42	
Texas A&I Univ.	5,981	100	731,204	598,100	+133,104		.165	120,649	-0-			
Texas Southern Univ.	9,427	100	582,684	942,700	-360,016		.118	68,757	-291,259		11.21	
Texas Woman's Univ.	7,848	100	761,425	748,800	- 23,375		.204	155,331	-0-			
UT-El Paso	13,697	100	920,346	1,369,700		- 449,354	.040	36,814		-412,540		30.22
UT-San Antonio	5,891	100	518,413	589,100	- 70,687		.114	59,099	-11,588		0.45	
Angelo State Univ.	4,979	93	350,047	463,047	-113,000		.111	38,855	-74,145		2.85	
Midwestern St. Univ.	3,933	93	391,040	365,769	+ 25,271		.148	57,874	-0-			
Pan American Univ.	9,462	93	590,368	879,966	-289,598		.107	63,169	-226,429		8.71	
Sul Ross St. Univ.	1,691	93	302,542	157,263	+145,279		.136	41,146	-0-			
Tarleton St. Univ.	3,293	93	446,152	306,249		+ 139,903	.219	97,707		-0-		
West Texas St. Univ.	5,730	93	1,060,828	532,890	+527,938		.207	219,591	-0-			
Corpus Christi St.	1,807	93	169,307	168,051	+ 1,256		.235	39,787	-0-			
Univ. of Houston-CLC	4,113	93	316,043	382,509	- 66,466		.100	31,604	-34,862		1.34	
UT-Dallas	4,650	100	413,711	465,000	- 51,289		.249	103,014	-0-			
UT-Permian Basin	1,065	93	211,892	99,045	+112,847		.315	66,746	-0-			
UT-Tyler	1,626	93	114,976	151,218	- 36,242		.245	28,169	-8,073		0.31	
				Total Deficits:	-3,483,679	-1,697,455			-2,598,264	-1,365,148	100%	100%

*Educational and General square foot figures in this column were calculated as of Fall 1977 for Coordinating Board ad valorem tax distribution recommendations. In actual use, all figures used by this model would be updated at least semi-annually.

and its designated E & G square feet per FTSE (Col. 3). Since this model seeks to project space needs to 1987, the Coordinating Board's projected full-time enrollment for 1987 is used in column 2. In all fairness, it must be acknowledged that these projections are above the actual growth rate experienced the past two years. In addition, projections for individual schools have been high for some and low for others. The projections are now being revised. Howevever, in the absence of updated projections, the previously adopted data are used for purposes of illustrating how the model works.

Column 4: The amount of E & G space the institution presently has, both on inventory and in varying but definite stages of development, is shown here.

Column 5: This is the product of column 2 times Column 3 and is the number of "raw" E & G square feet each institution "should have" under this approach.

Column 6 and 7: These columns contain the square foot differences between Columns 4 and 5, for non-Permanent University Fund (PUF) institutions and PUF participants respectively. A minus sign (-) indicates a square foot deficit, a plus sign (+) indicates a "surplus" in relation to the projected enrollment and designated square foot product.

Column 8: This column brings into the process the all-important space

utilization efficiency variable. As discussed earlier in this chapter, "raw" space need does not reflect actual need based on utilization of existing facilities. The "efficiency factor" contained in this column was obtained as follows: each institution's average hourly percentage use of classrooms over the full week is multiplied by the percentage representing the classroom proportion of total E&G space for that school. The result is then added to the corresponding proportional class laboratory figure and that total is divided by the percentage representing the combined classroom-class laboratory proportion of total E&G space. This step produces a weighted composite hourly room use figure for classrooms and class labs combined. A second element is produced in the same manner, substituting the adjusted station use percentages for classrooms and class labs respectively for the hourly room use percentages used above. The two elements are then added and their sum divided by two to produce the weighted composite percentage of classroom - class lab use. Figure 1 below illustrates this procedure using the appropriate standards and the average public senior classroom and class lab percentages of total E&G space; the result at the far right in Figure 1 is the actual weighted composite standard value:

$$\frac{(.54)\ (.13) + (.36)\ (.13)}{.26} + \frac{(.66\ 2/3)\ (.13) + (.80)\ (.13)}{.26} = 1.184 \div 2 = .592$$

(Hourly Room Use) + (Station Occupancy)

The result of the calculation using each institution's data is then subtracted from .592 to produce the "efficiency factor," which is that school's weighted composite usage below (or above) the corresponding standard, or a percentage representation of its unused space (or of its above-average use of space).

Column 9: This figure, representing present unused space in relation to the efficiency factor, is the product of Column 4 times Column 8.

Columns 10 and 11: These columns correspond to Columns 6 and 7. The figures contained in Columns 10 and 11 are all "adjusted deficits" obtained by subtracting the figures in Column 9 from the corresponding figures in Columns 6 and 7.

Columns 12 and 13: These columns merely contain the percentage which each school's adjusted deficit represents of the total adjusted deficit for all schools in the same category (i.e., PUF, Non-PUF). "Surpluses" are not reflected in Columns 10 through 13.

Following the procedure outlined in Tables 8 and 9, it is possible to estimate in precise terms the total need for new square feet of facilities over a specific time period. This method does not, though, address the need for major repair and renovation, the need for conversion of space to other uses, or the need for energy conservation modifications, etc. An accurate estimate of this aspect of facilities need would depend in major part on an evaluation of existing facilities structure by structure.

The total adjusted deficits of columns 10 and 11, Table 9 may be converted to an estimated capital investment in new space as follows:

Total adjusted deficit - 3,963,412 E&G Square Feet

E and G (assignable area) as a percentage of gross area - 63%

Total gross area deficit - 6,291,130 (Non-Puf portion: 4,124,229 sq.ft.)

Total capital investment at the current approximate rate of $60 per square foot - $377,467,800 (Non-PUF portion: $247,453,714)

At a current estimated annual operating cost of $4.63 per E and G square foot, these adjusted deficits of E and G space will cost an additional $12,029,962 (Non-PUF) and $6,320,635 (PUF) per year to operate.

As discussed eariler, requirements in square feet in a category as broad as educational and general space leaves great latitude to the individual institution in selecting the types of new construction which will be undertaken in response to its deficit. Overall deficits will shrink even if the space added to an institution's inventory is inappropriate in type or configuration to its internal space-use needs. However, institutional needs and related problems will not be alleviated by such inappropriate "solutions."

CHAPTER 6

FACILITIES UTILIZATION ANALYSIS AND SPACE PLANNING - A SUMMARY

CHAPTER 6

FACILITIES UTILIZATION ANALYSIS AND SPACE PLANNING - A SUMMARY

A significant benefit gained from the foregoing analysis is the general orientation to space as a commodity which possesses critical cost-use characteristics. As higher education faces levelling enrollments, rising construction, maintenance and utilities costs, and a diminishing quantitative need for additional new space, a viable solution to most of the space needs which do emerge in the next decade clearly lies in the more efficient use of existing facilities.

Since the utilization variables of enrollment, course load, and number of available rooms are not readily susceptible to deliberate manipulation, actual room utilization is largely determined by institutional methods of assigning space and responding to faculty and student preferences in class times. Although utilization can be improved with resulting reductions in space needs and costs to the taxpayer by various measures such as the four-day week and careful class schedule coordination, there are student and program charactistics which limit the usefulness of such approaches for many institutions. Utilization potential as an actual resource of an institution, then, plays its most effective role when new stresses such as fluctuations in enrollment and specialized program needs are put on existing facilities.

In response to emerging facilities needs, the unused potential offered by present facilities must be critically and objectively evaluated before new construction, with its commitment to new capital and operating costs, is

undertaken. Where the institution must accommodate more students, the first option should be to fully employ under-used space. Where pressure for new facilities is created by emerging program needs, compatible space which is not being used to full potential should be more efficiently employed in response to those needs. If the program need is for specialized space, under-used space in general or other specific program areas often can be converted to the required program use.

Conversion of facilities has the dual benefit of increasing utilization of rooms receiving little use and of creating useable facilities in areas for which need has been demonstrated, with a lower capital investment than for new construction and little or even no new operating costs. As long as the unused portion of an institution's full utilization potential is properly recognized as a resource, existing facilities often will provide the solution to emerging facilities needs.

This paper is not designed to examine all of the approaches to or all of the measures of facilities utilization, nor to present a facilities planning model for any specific school. What this paper has attempted to do is sketch out the need for more cost-efficient space use and some approaches by which to achieve it.

One broad conclusion is clear: there is significant justification and incentive to make better use of existing campus facilities. Adding to the public burden by constructing more buildings should be the last rather than the first option considered and is justifiable only after existing space is utilized as efficiently as possible.

APPENDIX A

WEEKLY ROOM HOURS

FOUR-YEAR

TABLE A

WEEKLY ROOM HOURS

Institution	Classrooms	Class Laboratories
Angelo State University	22.6	12.4
East Texas State	16.8	12.5
Lamar University	19.5	15.3
Midwestern State	14.4	12.7
North Texas State	23.5	20.2
Pan American University	25.0	11.9
Sam Houston State	19.5	11.1
Southwest Texas State	31.9	19.3
Stephen F. Austin	19.5	15.1
Sul Ross State	15.1	12.0
Prairie View A & M	13.9	13.7
Tarleton State University	13.0	14.6
Texas A & I University	19.4	13.5
Texas A & M University	29.2	20.9
Texas Southern University	23.8	16.7
Texas Tech University	23.3	15.0
Texas Womans University	15.0	13.2
University of Houston	30.5	19.7
UT - Arlington	22.9	15.2
UT - Austin	27.0	19.3
UT - El Paso	26.8	14.3
UT - San Antonio	20.4	23.0
West Texas State	12.2	11.7
Average - All Institutions	22.6	16.5

APPENDIX B

HOURLY ROOM USE

FOUR-YEAR

TABLE B-1

AVERAGE HOURLY PERCENTAGES 8 AM - 10 PM

Appendix B
Public Four Year

Institution	CLASSROOMS							CLASS LABORATORIES						
	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Monday-Fri. 5 Day Avg.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Monday-Fri. 5 Day Avg.
Angelo State Univ.	36.1	30.1	35.7	29.0	30.5	.3	32.3	18.9	20.2	21.9	18.4	9.2	2.0	17.7
East Texas State	27.2	22.9	26.0	21.0	23.0	6.6	24.0	20.9	17.8	21.0	17.7	12.1	3.7	17.9
Lamar University	32.3	26.4	31.4	25.4	23.5	.0	27.8	22.2	25.5	24.0	24.6	12.8	.0	21.8
Midwestern State	23.7	17.5	25.1	16.4	19.6	.0	20.5	22.9	21.4	19.6	17.9	9.3	.0	18.2
North Texas State	40.2	29.9	40.3	28.2	28.9	.3	33.5	31.2	29.3	32.2	28.4	23.4	.0	28.9
Pan American Univ.	42.2	34.6	41.2	30.7	29.8	.0	35.7	16.8	22.1	16.8	18.3	11.2	.5	17.0
Sam Houston State	29.1	29.8	28.6	29.2	22.3	.4	27.8	18.1	24.2	13.3	22.8	.9	.0	15.9
Southwest Texas St.	47.0	50.1	45.3	47.9	37.0	.3	45.5	27.2	32.9	32.3	28.5	16.9	.2	27.6
Stephen F. Austin	32.2	27.5	30.9	25.2	23.6	.0	27.9	27.4	21.7	27.9	19.1	11.2	.0	21.5
Sul Ross State	26.0	20.3	23.8	18.6	19.2	.0	21.6	17.6	20.9	23.2	15.0	8.6	.0	17.1
Prairie View A&M	22.1	16.7	23.8	17.7	19.2	8.0	19.9	20.6	19.6	22.0	19.3	15.9	3.5	19.5
Tarleton State Univ.	21.4	15.7	21.7	16.7	17.3	.0	18.6	24.0	23.5	26.6	22.1	8.5	.0	20.9
Texas A&I Univ.	29.5	29.8	28.5	28.0	22.8	.6	27.7	19.8	22.3	21.9	22.5	10.1	.0	19.3
Texas A&M Univ.	47.7	38.3	47.8	37.1	37.8	.0	41.7	29.3	34.3	32.9	30.8	22.1	.2	29.9
Texas Southern Univ.	37.0	32.9	39.0	31.2	30.1	12.6	34.0	21.8	31.9	21.9	27.6	15.6	4.7	23.8
Texas Tech Univ.	36.1	33.9	36.1	31.9	28.5	.2	33.3	22.1	26.0	23.2	23.1	12.4	.0	21.4
Texas Womans Univ.	24.3	24.1	23.5	20.6	14.3	.9	21.4	20.3	22.2	17.7	19.4	15.1	1.0	18.9
Univ. of Houston	49.5	49.0	48.1	47.7	23.8	.1	43.6	28.0	32.5	32.3	32.7	15.6	3.4	28.2
UT-Arlington	33.9	38.8	34.0	37.5	19.2	.0	32.7	23.9	24.1	24.4	21.7	14.2	.4	21.7
UT-Austin	39.8	41.9	40.2	40.0	30.7	.1	38.5	27.4	34.6	28.4	32.5	15.2	.4	27.6
UT-El Paso	40.6	40.3	40.9	40.0	29.7	.1	38.3	21.4	24.7	23.7	21.4	10.6	.0	20.4
UT-San Antonio	34.0	31.2	33.5	27.7	19.2	.0	29.1	34.6	32.5	41.4	35.0	20.3	.0	32.8
West Texas State	21.2	16.2	20.7	14.3	14.6	.4	17.4	17.4	18.9	20.9	17.1	9.0	.0	16.7
Average-All Inst.	35.6	33.1	35.4	31.5	25.8	1.0	32.3	24.5	27.2	26.3	24.9	14.7	.8	23.5

TABLE B-2

AVERAGE HOURLY PERCENTAGES 8 AM - 4:59 PM

Appendix B
Public Four-Year

	CLASSROOMS							CLASS LABORATORIES						
Institution	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Monday-Fri. 5 Day Avg.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Monday-Fri. 5 Day Avg.
Angelo State Univ.	50.1	39.4	51.0	40.5	47.4	.5	45.7	27.6	27.2	31.5	25.4	14.3	3.2	25.2
East Texas State	36.6	28.3	36.8	27.8	35.7	10.2	33.0	27.9	23.9	28.9	22.6	18.7	5.7	24.4
Lamar University	40.8	33.3	40.5	32.0	36.3	.0	36.6	28.1	32.6	30.3	32.8	19.9	.0	28.7
Midwestern State	33.0	22.0	34.9	21.8	30.5	.0	28.4	29.6	26.5	26.5	21.8	14.4	.0	23.8
North Texas State	54.1	36.5	53.5	36.5	45.1	.5	45.1	46.2	41.8	46.9	40.5	36.4	.0	42.4
Pan American Univ.	47.1	34.9	48.2	34.9	46.4	.0	42.3	23.4	29.7	23.4	23.8	17.4	.7	23.5
Sam Houston State	39.7	43.2	40.2	42.3	34.7	.6	40.0	22.9	30.3	17.7	28.8	1.4	.0	20.2
Southwest Texas	65.1	69.6	64.9	69.6	57.5	.6	65.3	38.2	44.1	45.1	40.0	26.0	.4	38.7
Stephen F. Austin	45.2	36.1	44.2	35.0	36.7	.0	39.4	38.7	29.3	40.8	26.4	17.0	.0	30.4
Sul Ross State	31.6	24.7	32.4	23.5	29.9	.0	28.4	25.7	28.9	33.7	20.6	13.4	.0	24.5
Prairie View A&M	31.8	22.6	32.8	24.1	29.2	12.4	28.1	29.8	28.9	31.5	28.7	22.4	5.3	28.3
Tarleton State	29.8	21.2	30.0	21.0	26.9	.0	25.8	37.0	36.6	39.2	34.4	13.3	.0	32.1
Texas A&I Univ.	40.1	40.8	39.5	39.9	34.3	.7	38.9	27.7	27.2	30.0	24.7	15.2	.0	25.0
Texas A&M Univ.	69.3	53.0	69.9	51.1	58.4	.0	60.3	42.8	49.9	47.4	45.1	33.9	.4	43.8
Texas Southern	43.7	35.8	45.2	33.7	39.1	18.9	39.5	28.9	41.8	27.4	37.4	19.0	7.3	30.9
Texas Tech	49.0	44.8	49.7	44.2	44.2	.4	46.4	30.1	36.3	32.8	33.2	18.0	.0	30.1
Texas Woman's	30.4	30.5	29.9	25.8	22.1	1.5	27.7	30.3	28.1	25.7	25.0	23.0	1.5	26.4
Univ. of Houston	53.0	52.5	51.2	51.6	37.0	.3	49.1	32.6	37.8	36.8	36.6	23.0	5.3	33.4
UT-Arlington	37.8	44.9	38.3	44.4	29.5	.1	39.0	33.8	34.8	34.2	31.5	20.7	.6	31.0
UT-Austin	56.8	57.8	57.2	57.1	47.7	.1	55.3	36.2	47.8	38.8	44.5	22.8	.7	38.0
UT-El Paso	51.5	50.7	51.3	50.5	46.3	.2	50.1	30.5	32.5	32.6	29.6	16.5	.0	28.3
UT-San Antonio	37.3	30.8	36.3	29.7	29.8	.0	32.8	48.8	44.4	58.3	46.6	30.0	.0	45.6
West Texas State	27.4	17.6	27.3	18.0	22.8	.6	22.6	23.1	22.4	29.0	20.8	14.0	.0	21.9
Average-All Inst.	46.8	42.1	46.9	41.3	39.8	1.5	43.4	33.9	37.0	36.4	34.1	22.2	1.2	32.7

TABLE B-3

AVERAGE HOURLY PERCENTAGES 5 PM - 10 PM

	CLASSROOMS							CLASS LABORATORIES						
Institution	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Monday-Fri. 5 Day Avg.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Monday-Fri. 5 Day Avg.
Angelo State Univ.	10.9	13.5	8.0	8.4	.0	.0	8.2	3.2	7.7	4.5	5.8	.0	.0	4.2
East Texas State	10.3	13.1	6.4	8.8	.1	.0	7.7	8.2	6.9	6.9	8.9	.3	.0	6.2
Lamar University	17.1	14.0	15.0	13.5	.4	.0	12.0	11.5	12.8	12.5	10.0	.0	.0	9.4
Midwestern State	7.0	9.2	7.3	6.8	.0	.0	6.1	10.9	12.1	7.2	10.9	.0	.0	8.2
North Texas State	15.2	18.0	16.5	13.3	.0	.0	12.6	4.2	6.7	5.8	6.7	.2	.0	4.7
Pan American Univ.	33.3	34.1	28.4	23.3	.0	.0	23.8	4.9	8.5	4.9	8.5	.0	.0	5.4
Sam Houston State	10.0	5.6	7.6	5.6	.0	.0	5.8	9.3	13.3	5.3	11.9	.0	.0	8.0
Southwest Texas	14.4	14.8	10.1	8.8	.0	.0	9.6	7.5	12.7	9.1	7.8	.5	.0	7.5
Stephen F. Austin	8.7	11.9	7.0	7.4	.0	.0	7.0	7.0	8.0	4.6	5.8	.6	.0	5.2
Sul Ross State	16.1	12.2	8.4	10.0	.0	.0	9.3	2.8	6.4	4.2	4.9	.0	.0	3.7
Prairie View A&M	4.7	6.1	7.7	6.3	1.1	.0	5.2	4.1	2.9	5.0	2.5	4.1	.4	3.7
Tarleton State	6.2	5.9	6.7	9.1	.0	.0	5.6	.6	.0	4.0	.0	.0	.0	.9
Texas A&I Univ.	10.6	10.2	8.6	6.6	2.1	.5	7.6	5.5	13.5	7.5	18.5	1.0	.0	9.2
Texas A&M Univ.	8.8	11.8	8.2	12.0	.6	.0	8.3	5.1	6.2	6.9	5.2	.7	.0	4.8
Texas Southern	25.1	27.6	27.9	26.7	13.8	1.3	24.2	8.9	14.2	12.1	10.0	9.4	.0	10.9
Texas Tech	13.0	14.2	11.6	9.8	.3	.0	9.8	7.6	7.4	6.0	5.0	2.3	.0	5.7
Texas Woman's	13.5	12.5	11.9	11.3	.2	.0	9.9	2.3	11.7	3.5	9.4	.7	.0	5.5
Univ. of Houston	43.1	42.6	42.6	40.6	.0	.0	33.8	19.8	22.9	24.0	25.6	2.3	.0	18.9
UT-Arlington	26.9	27.8	26.2	25.1	.7	.0	21.3	6.2	4.8	6.7	4.1	2.4	.0	4.8
UT-Austin	9.3	13.2	9.7	9.2	.1	.0	8.3	11.7	10.9	9.5	11.0	1.5	.0	8.9
UT-El Paso	20.9	21.7	22.1	21.0	.0	.0	17.1	5.0	10.8	7.8	6.6	.0	.0	6.0
UT-San Antonio	28.0	31.9	28.5	24.1	.0	.0	22.5	9.0	11.0	11.0	14.0	3.0	.0	9.6
West Texas State	10.0	13.6	8.8	7.9	.0	.0	8.1	7.0	12.6	6.3	10.5	.0	.0	7.3
Average-All Inst.	15.6	16.8	14.7	13.9	.7	.1	12.3	7.6	9.6	8.2	8.5	1.3	.0	7.0

TABLE B-4

AVERAGE HOURLY PERCENTAGES 10 AM - 2:59 PM

Institution	CLASSROOMS							CLASS LABORATORIES						
	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Monday-Fri. 5 Day Avg.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Monday-Fri. 5 Day Avg.
Angelo State Univ.	58.0	50.9	59.0	51.6	54.5	.6	54.8	25.1	27.7	28.4	27.7	14.2	3.2	24.6
East Texas State	46.6	29.4	47.1	29.3	45.6	11.8	39.6	33.4	24.5	33.4	23.4	22.0	5.5	27.3
Lamar University	59.2	45.1	59.0	43.9	53.8	.0	52.2	25.6	33.1	28.4	34.1	20.9	.0	28.4
Midwestern State	36.3	28.2	38.0	28.3	33.6	.0	32.9	29.7	24.8	27.2	20.0	15.7	.0	23.5
North Texas State	67.0	51.8	66.6	51.7	55.9	.6	58.6	50.4	44.6	49.0	43.7	39.9	.0	45.5
Pan American Univ.	58.7	44.3	59.7	44.3	57.7	.0	52.9	35.7	22.1	36.4	20.7	25.7	.0	28.1
Sam Houston State	41.4	50.0	42.1	49.1	40.1	.7	44.5	20.0	29.3	16.0	23.9	2.6	.0	18.4
Southwest Texas	76.3	82.1	76.3	82.4	70.9	.4	77.6	40.2	44.9	44.4	41.3	27.8	.5	39.7
Stephen F. Austin	51.0	50.9	50.0	49.1	40.1	.0	48.2	40.6	34.4	42.7	29.5	18.1	.0	33.1
Sul Ross State	35.3	33.8	36.9	33.1	33.8	.0	34.6	25.0	24.2	31.4	14.3	12.8	.0	21.5
Prairie View A&M	34.8	26.1	36.3	28.1	32.4	17.7	31.5	30.8	32.0	31.6	33.7	23.7	6.2	30.4
Tarleton State	31.4	28.3	30.6	27.7	28.5	.0	29.3	37.3	40.0	40.6	34.0	13.9	.0	33.2
Texas A&I Univ.	44.4	47.6	43.4	47.2	39.4	.8	44.4	26.5	27.0	26.5	22.0	14.0	.0	23.2
Texas A&M Univ.	74.1	61.7	74.9	59.4	65.2	.0	67.1	40.5	48.2	44.1	43.9	34.8	.7	42.3
Texas Southern	50.8	41.8	52.5	39.8	44.5	20.8	45.9	30.5	44.7	29.4	38.4	20.0	9.4	32.6
Texas Tech	60.7	50.6	62.1	50.3	56.3	.5	56.0	26.8	35.2	31.0	33.1	18.1	.0	28.8
Texas Woman's	34.5	34.2	34.0	29.2	27.0	1.9	31.8	31.3	30.5	24.3	23.9	27.4	2.0	27.5
Univ. of Houston	63.4	69.0	62.2	69.0	44.5	.3	61.6	34.9	42.7	39.8	41.3	26.0	6.2	36.9
UT-Arlington	41.7	61.1	42.3	60.4	32.2	.1	47.5	34.3	37.5	34.8	34.7	21.4	.6	32.5
UT-Austin	65.4	66.4	66.2	65.3	59.6	.1	64.6	36.3	48.7	38.8	44.5	23.9	.8	38.4
UT-El Paso	56.4	58.3	55.9	58.5	50.9	.2	56.0	31.6	32.4	32.9	30.4	18.2	.0	29.1
UT-San Antonio	42.3	42.0	42.6	41.5	35.0	.0	40.7	51.0	48.0	65.0	51.0	33.0	.0	49.6
West Texas State	29.0	24.0	28.8	24.3	22.6	.7	25.7	24.5	27.7	29.8	25.2	14.4	.0	24.3
Average-All Inst.	54.2	51.5	54.5	50.7	47.5	1.8	51.7	34.3	38.0	36.5	35.0	23.6	1.4	33.5

APPENDIX C

STUDENT STATION USE

FOUR-YEAR

TABLE C

STUDENT STATION USE

Institution	Classrooms			Class Laboratories		
	Percent Occupancy	Area (Sq.Ft.)	Adjusted % Occupancy*	Percent Occupancy	Area (Sq.Ft.)	Adjusted % Occupancy*
Angelo State University	56.5	15.9	58.6	68.9	32.9	83.8
East Texas State Univ.	41.7	16.0	43.0	68.6	39.4	69.6
Lamar University	55.0	16.8	54.0	81.0	41.0	79.0
Midwestern State Univ.	53.2	15.5	56.6	59.4	26.4	90.0
North Texas State Univ.	56.7	16.3	57.4	72.2	34.1	84.7
Pan American University	79.5	18.7	70.1	64.4	36.2	71.2
Sam Houston State Univ.	62.8	16.3	63.6	65.5	37.7	69.5
Southwest TExas State Univ.	60.8	17.0	59.0	79.3	35.4	89.6
Stephen F. Austin State	55.3	16.3	56.0	75.1	38.7	77.6
Sul Ross State Univ.	74.0	21.3	57.3	100.0	48.4	82.6
Prairie View A&M Univ.	61.9	16.3	62.7	55.0	26.6	82.7
Tarleton State University	44.8	17.4	42.5	48.5	29.6	65.5
Texas A&I University	49.0	16.1	50.2	72.5	38.5	75.3
Texas A&M University	48.0	15.2	52.1	74.3	41.1	72.3
Texas Southern University	53.6	16.5	53.6	94.7	49.0	77.3
Texas Tech University	60.7	15.5	64.6	95.0	39.7	95.7
Texas Womans University	45.3	17.0	44.0	93.1	46.0	81.0
University of Houston	52.9	13.6	64.2	84.8	33.3	101.9
Univ. of Texas - Arlington	64.6	15.8	67.5	96.8	32.9	117.7
Univ. of Texas - Austin	57.9	15.6	61.2	75.8	37.7	80.4
Univ. of Texas - El Paso	68.2	16.3	69.0	89.2	38.7	92.2
Univ. of Texas - San Antonio	56.5	16.1	57.9	100.0	53.8	74.3
West Texas State University	43.1	16.7	42.6	71.5	36.4	78.6
Average - All Institutions:	55.8	16.4	56.1	75.9	38.0	79.9

* This column contains the station occupancy rate adjusted to reflect the square feet devoted to the average student station in relation to station area standards of 16.5 sq.ft. (classroom) and 40 sq.ft. (class lab).

APPENDIX D

WEEKLY ROOM HOURS

HOURLY ROOM USE

STUDENT STATION USE

UTILIZATION ANALYSIS DATA
UPPER-LEVEL

TABLE D-1

WEEKLY ROOM HOURS

Institution	Classrooms	Laboratories
Corpus Christi State University	21.5	8.3
University of Houston - Clear Lake City	15.3	9.5
University of Texas at Dallas	12.2	9.7
University of Texas of Permian Basin	16.5	6.4
University of Texas at Tyler	21.3	11.6
Average - All Institutions	16.0	9.1

TABLE D-2

STATION OCCUPANCY

	Classrooms			Class Laboratories		
Institution	Percent Occupancy	Area (Sq.Ft.)	Adjusted % Occupancy*	Percent Occupancy	Area (Sq.Ft.)	Adjusted % Occupancy*
Corpus Christi State Univ.	58.5	18.9	51.1	52.5	44.1	47.6
University of Houston -CLC	71.7	19.1	61.9	96.5	41.2	93.7
University of Texas - Dallas	52.8	16.8	51.9	55.0	41.9	52.5
Univ. of Texas - Permain Basin	66.1	26.0	41.9	77.1	85.2	36.2
University of Texas - Tyler	51.3	24.0	35.3	68.9	46.9	58.8
Average - All Institutions	59.0	21.0	46.4	68.8	51.9	53.0

* This column contains the station occupancy rate adjusted to relfect the square feet devoted to the average student station in relation to station area standards of !6.5 sq.ft. (classroom) and 40 sq.ft.(class lab).

TABLE D-3

AVERAGE HOURLY PERCENTAGES OF USE

Institution	Classroom							Class Laboratories						
8 AM - 10 PM														
	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Monday-Fri. 5 Day Avg.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Monday-Fri. 5 Day Avg.
Corpus Christi St. U.	30.1	45.9	33.1	30.1	14.2	.0	30.7	14.8	15.4	16.0	7.1	5.9	.0	11.8
Univ. of Houston-CLC	23.7	28.7	26.9	24.4	5.9	.9	21.9	19.8	8.1	24.4	13.2	2.5	.0	13.6
UT-Dallas	20.5	19.0	21.0	19.7	6.8	1.5	17.4	16.0	16.0	18.7	15.6	2.6	1.3	13.8
UT-Permian Basin	28.0	26.5	28.8	26.2	8.4	.0	23.6	11.3	11.9	11.8	10.7	.0	.0	9.1
UT-Tyler	36.5	34.5	34.5	31.1	15.4	.0	30.4	18.5	22.1	17.1	20.0	5.0	.0	16.5
Average-All Insti.	25.4	28.5	26.9	24.6	8.9	.8	22.9	16.4	14.2	17.8	13.3	3.1	.3	13.0
8 AM - 4:59 PM														
Corpus Christi St. U.	22.7	25.1	23.5	24.0	21.9	.0	23.4	19.4	18.4	20.3	11.1	9.2	.0	15.7
Univ. of Houston-CLC	11.4	14.6	13.7	11.6	9.2	1.5	12.1	10.2	.7	12.6	7.1	3.9	.0	6.9
UT-Dallas	13.5	14.7	14.9	15.1	10.4	2.3	13.7	18.0	15.2	22.2	15.3	4.1	2.1	15.0
UT-Permian Basin	19.8	19.0	20.2	17.4	12.7	.0	17.8	12.0	7.4	13.8	7.4	.0	.0	8.1
UT-Tyler	30.6	30.2	31.5	30.2	24.0	.0	29.3	21.1	24.4	17.7	24.4	7.7	.0	19.1
Average-All Insti.	16.9	18.5	18.3	17.5	13.7	1.2	17.0	15.8	12.5	17.7	12.5	4.8	.5	12.7
5 PM - 10 PM														
Corpus Christi St. U.	43.3	83.3	50.4	40.9	.4	.0	43.7	6.6	10.0	8.3	.0	.0	.0	5.0
Univ. of Houston-CLC	45.7	54.2	50.6	47.6	.0	.0	39.6	37.1	21.4	45.7	24.2	.0	.0	25.7
UT-Dallas	33.0	26.9	31.8	28.1	.4	.0	24.0	12.5	17.5	12.5	16.2	.0	.0	11.7
UT-Permian Basin	42.8	40.0	44.2	42.1	.7	.0	34.0	9.9	20.0	8.3	16.6	.0	.0	11.0
UT-Tyler	47.2	42.4	40.0	32.8	.0	.0	32.5	14.0	18.0	16.0	12.0	.0	.0	12.0
Average-All Insti.	40.7	46.8	42.2	37.6	.3	.0	33.5	16.6	17.5	18.8	14.4	.0	.0	13.5
6 PM - 10 PM														
Corpus Christi St. U.	48.8	97.0	57.7	47.6	.6	.0	50.3	6.2	10.4	6.2	.0	.0	.0	4.6
Univ. of Houston-CLC	55.2	64.0	58.7	57.2	.0	.0	47.0	39.2	21.4	53.5	26.7	.0	.0	28.2
UT-Dallas	36.6	30.2	34.9	31.9	.3	.0	26.8	15.6	17.2	15.6	15.6	.0	.0	12.8
UT-Permian Basin	44.6	50.0	47.3	52.6	.9	.0	39.1	10.4	22.9	8.3	18.7	.0	.0	12.1
UT-Tyler	57.0	51.0	48.0	41.0	.0	.0	39.4	17.5	22.5	17.5	12.5	.0	.0	14.0
Average-All Insti.	46.6	54.9	47.8	44.6	.4	.0	38.9	18.3	18.8	21.1	15.2	.0	.0	14.7

APPENDIX E

SPACE DISTRIBUTION WITHIN TOTAL EDUCATION AND GENERAL

PUBLIC SENIOR INSTITUTIONS

TABLE E

DISTRIBUTION OF SELECTED SPACE CATEGORIES WITHIN THE EDUCATIONAL AND GENERAL TOTAL*

Institution	E & G Square Feet	As A Percentage of E & G: Instruction and Library	Research	Classroom	Class Laboratory	Faculty Office
Angelo State University	351,809	78%	3%	18%	17%	11%
East Texas State	841,008	90%	0.2%	16%	17%	17%
Lamar University	775,892	87%	1%	19%	19%	15%
Midwestern State	406,567	85%	2%	17%	10%	13%
North Texas State	1,504,299	71%	6%	12%	10%	16%
Pan American University	535,174	72%	0.3%	12%	12%	14%
Sam Houston State	860,198	89%	0.7%	19%	12%	12%
Southwest Texas State	793,479	73%	1%	16%	13%	13%
Stephen F. Austin	782,512	84%	1%	17%	14%	14%
Sul Ross State	299,494	73%	2%	12%	17%	9%
Prairie View A & M	532,448	80%	1%	12%	19%	13%
Tarleton State University	433,191	90%	0.2%	16%	18%	12%
Texas A & I University	718,688	82%	1%	20%	16%	13%
Texas A & M University	3,059,829	61%	19%	9%	13%	18%
Texas Southern University	562,915	80%	2%	19%	21%	17%
Texas Tech University	2,352,798	65%	18%	13%	13%	18%
Texas Womans University	751,081	76%	8%	22%	12%	15%
University of Houston	2,260,867	66%	15%	8%	13%	22%
UT - Arlington	1,215,814	84%	6%	18%	23%	20%
UT - Austin	5,468,287	51%	26%	9%	6%	21%
UT - El Paso	956,268	80%	4%	16%	21%	17%
UT - San Antonio	549,256	74%	2%	18%	13%	11%
West Texas State	948,045	76%	1%	14%	13%	10%
Public University Subtotals	26,959,919	70%	11%	13%	13%	17%
Corpus Christi State U.	293,391	81%	1%	16%	14%	12%
U. of H. - Clear Lake	317,890	77%	--	17%	9%	21%
UT - Dallas	539,669	60%	19%	15%	5%	19%
UT - Permian Basin	211,066	61%	--	15%	15%	9%
UT - Tyler	107,937	72%	--	18%	11%	14%
Upper-Level Subtotals	1,469,953	69%	7%	16%	10%	16%

* Fall 1979 Facilities Inventory Figures

APPENDIX F

GLOSSARY OF TERMS

GLOSSARY OF TERMS

Ad Valorem Tax Fund - A constitutional fund for new facilities construction on the campuses of 17 designated public universities, which is funded from ad valorem property tax revenues.

Assignable Space - The square footage in a building's interior rooms which is actually assigned for a variety of specific institutional purposes (i.e., classrooms and class laboratories, offices, storage rooms, conference rooms, etc., but not hallways, mechanical rooms, stairways, etc.).

Average Weekly Room Hours/Weekly Room Hours/WRH - These are interchangeable terms indicating the number of hours per week which the average room of a given type is actually in use.

Building and Room Report - The report, filed each fall semester by the public senior institutions with the Coordinating Board, which contains such information as course number, class size, time and duration of class meeting, and the building and room number and room type of the meeting location.

Educational and General Space - Educational and General (E&G) Space is a nationally recognized assignable, or net, space inventory category which includes all enclosed assignable space on a campus except that assigned to the "Auxiliary Service" category (i.e., student unions, bookstores, dormitories, etc.), or to non-institutional or unassigned use categories.

Efficiency Ratio - The ratio of an actual measure of utilization (e.g., WRH) divided by the corresponding standard. The resulting ratio or percentage shows the efficiency of actual use in relation to the standard.

Full Time Student Equivalent (FTSE) - One FTSE is the number of semester credit hours (sch) equivalent to the course load of a full-time student (i.e., 15 sch for all levels of study). The FTSE total for a campus is calculated by dividing an institution's total sch by 15 for one semester or by 30 for the base period fiscal year.

Operating Week - The total hours per week during which an institution conducts class meetings. In this study, the "operating week" is 70 hours long, 8 a.m. to 10 p.m., Monday through Friday; this corresponds generally with the operating schedules of the public senior institutions.

Permanent University Fund (PUF) - A constitutional fund primarily for the new construction of facilities on designated campuses of the University of Texas and Texas A & M University Systems, which is funded from the proceeds of an endowment.

Student Station Use/Station Occupancy - The proportion of seating capacity in an average classroom or class laboratory which is actually occupied during the average class meeting; this proportion, expressed as a percentage, is not affected by periods during which rooms are not in use.

Use Capacity - The optimum feasible level of use which can be made of a particular room type; this term refers in the present study to the various use "standards" (e.g., the "use capacity" in WRH of classrooms is 38 WRH).